

1.

STATISTICS OF VACCINATION

AT THE
GREENWICH PUBLIC VACCINATION
STATION,

FROM FEBRUARY 23, 1870, TO SEPTEMBER 29, 1875,

BEING
A REPORT
TO THE GREENWICH BOARD OF GUARDIANS,
PRESENTED FEBRUARY 1ST, 1876,

BY
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M.R.C.S.E., &c.,^C

PUBLIC VACCINATOR FOR THE GREENWICH DISTRICT OF THE GREENWICH UNION.

LONDON :
J. AND A. CHURCHILL, NEW BURLINGTON STREET.

—
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CONTENTS.

PAR.	PAGE.
1. Of the lymph in use	5
2. Of continuous vaccination	6
3. Of the weekly attendance at the station	6
4. Of the ratio existing between the stational vaccinations and the total births in the district	6
5. Of the non-advisability of a second station	7
6. Of the amount of success	7
7. Of the degree of success	9
8. Of the quality of success	10
9. Of grants from the Local Government Board	11
10. Of the method of performing the operation of vaccination	11
11. Of the selection of the vaccinator	13
12. Of inspection after vaccination	13
13. Of the value of the vaccination officer	14
14. Of the distribution of lymph	14
15. Of the preservation of lymph	15
16. Of sequelæ	15
(a) Vesicular eruption	17
(b) Erysipelas	17
(c) Treatment of sequelæ	17
17. Of the non-conveyance of other diseases by vaccination	18
18. Of re-vaccination	19
19. Of the method of performing the operation of re-vaccination at the station	19
20. Of the complete immunity from small pox conferred by re-vaccination	19
21. Of the re-vaccination of "Fisgard" boys	21
22. Of the method of performing the operation of re-vaccination on "Fisgard" and Royal Hospital School boys	21
23. Of fainting after re-vaccination	22
24. Of the necessity of producing in vaccinating a large number of vesicles	23
(a) Mr. Marson's experience, 1836—67	23
(b) Dr. Seaton's opinion, 1867	24
(c) Experiences of the epidemic of 1871	25
(a) Returns from Hampstead, Homerton, and Stockwell Hospitals	25
(b) Return from Merthyr Tydvil	26
(c) Return from Glasgow Fever Hospital	26
(d) Return from Leeds Hospital	27
(e) Duration of the disease in those who recover	27
25. Of the insufficiency of vaccination as ordinarily performed by private practitioners	28
26. Conclusion	29
Copy of letter received from the Guardians after the presentation of the Report	30

LIST OF TABLES.

- TABLE I. Showing the ratio that the stational vaccinations bear to the births in the district, the vaccinations being compared with the births of the previous quarter.
- TABLE II. Abstract of Table I, showing the ratio between the births and vaccinations of each year.
- TABLE III. Showing the total number of vaccinations in each quarter from February 23rd, 1870, to September 29th, 1875, with the result of the operation, distinguishing those in children (*a*) under six months, (*b*) six months and under twelve months, (*c*) one year and upwards.
- TABLE IV. Abstract of Table III, showing the results in years.
- TABLE V. Abstract of Table III, showing the results of the last four years only.
- TABLE VI. Showing for each quarter the number of cases in which 8, 7, 6, 5, 4, 3, 2, and 1 vesicles were produced respectively.
- TABLE VII. Abstract of Table VI, showing the totals of years.
- TABLE VIII. Showing the quality of the vesicles produced.
- TABLE IX. Abstract of Table VIII.
- TABLE X. Sequelæ of vaccination.
- TABLE XI. Re-vaccination at the station.
- TABLE XII. Re-vaccination of recruits for the Navy received on board H.M.S. "Fisgard," ages between fifteen and seventeen years.
- TABLE XIII. Re-vaccination of the boys admitted into the Royal Hospital School, Greenwich, ages between ten and fifteen years.

To the Greenwich Board of Guardians.

GENTLEMEN,

Having been conducting your vaccination station at Greenwich since February 23rd, 1870,—at which date the arrangements of the Local Government Board came into force, reducing the number of public stations, so as to permit of arm-to-arm vaccination being continuously carried on at each,—I am desirous of presenting to you the following report, based on the facts recorded in my registers.

1. Of the lymph in use.—The lymph I am still using is *the same* with which I commenced five-and-a-half years ago, and which was then obtained from two infants with good arms, kindly sent me by Dr. Forsyth of East Greenwich, one of the public vaccinators under the old *régime*. My thanks, at starting, are therefore due to that gentleman, and I take this opportunity of publicly offering them to him.

Tracing the source of the lymph back still further, Dr. Forsyth informs me that it had been some years previously passed on to him by his predecessor and partner, the late Dr. Cogan, and that that gentleman had been in the habit of from time to time applying to the National Vaccine Establishment for fresh supplies. It is therefore highly probable that the lymph came primarily from Mr. Marson's station in the Blackfriars Road, and, if so, is Jennerian, for at that time Mr. Marson was working with lymph originally taken by Jenner himself. He has recently, however, considered it advisable to obtain a fresh stock from the cow, or rather, heifer.

Whether mine be Jennerian lymph or not, many years must certainly have elapsed since it first came from the cow; yet notwithstanding the length of time during which it has been passed through succeeding human subjects, it is still in a very active state, as the following pages testify, and, judging from the appearance of the vesicles produced, the course they run, and

the foveation, depth, and durability of the cicatrices resulting, seems to have really improved since it came into my hands.

Although thus active when recent, it becomes unreliable when preserved; if kept in a tube for even so short a space of time as twenty-four hours, it is apt to miss—out of five places attempted, perhaps only two or three will succeed. A partial failure of this kind hardly ever happens in the direct vaccination at the station, and the practical deduction to be drawn therefrom, is never to use preserved lymph at all, if it can be by any possibility avoided.

2. Of continuous vaccination.—Direct arm-to-arm vaccination has, with two exceptions, been continuously carried on throughout the whole five-and-a-half years, the exceptions being in 1872, when Christmas-day fell on a Wednesday (vaccination day), and the vaccination necessarily lapsed, and on December 30th, 1873, when only two infants vaccinated the week before were brought up, and neither of these was suitable for supplying lymph. On both these occasions, recourse was had to tubes charged the week previously.

3. Of the weekly attendance.—The average weekly attendance has been 10 : the maximum 34, and the minimum 1 ; but during the whole period, some have always presented themselves, even in the most inclement weather.

4. Of the ratio existing between the stational vaccinations and the total births in the district.—This is shown in Tables I. and II. the vaccinations being compared with the births of the previous quarter, as, of course, it is not until the infants are three months old that they are brought to be vaccinated. The number of births is obtained from the quarterly returns of the Registrar-General, kindly supplied me by the local Registrars, Mr. Hume and Mr. Allworth, with the exception of the month of December, 1869, and the quarter ending Michaelmas, 1871, which could not be obtained, and have, therefore, been estimated.

It will be seen that the births have been 8,047, and the successful vaccinations 2,946, or 30·41 per cent.—over one-third. Analysing this still further, we find that 4,014 were born in East

Greenwich, and 4,033 in West Greenwich ; and that of the vaccinations, 1,231 came from East Greenwich, 1,672 from West Greenwich, and 43 were at the time residing out of the district, although probably born in it, and coming to me in consequence of the notice paper containing my name.

There are unfortunately no means of ascertaining the numbers publicly vaccinated under the old arrangements. This is to be regretted, for it would have been instructive to have compared them with the present numbers.

5. Of the non-advisability of a second station.—

I have been asked as to the advisability or otherwise of establishing another station, and fixing it somewhere in East Greenwich. Now, I am quite sure that the Local Government Board would never consent to such an arrangement, neither do I think that it would be a desirable one. Undoubtedly, were this carried into effect, many infants now vaccinated privately in East Greenwich, whose parents prefer paying a small fee to traversing the distance to the present station, particularly in inclement weather, would then be vaccinated at the public station, and we may fairly conclude that the numbers from East Greenwich would then equal, or even exceed, those from West Greenwich (*vide* Table I.), but the result would be that the present station would be drained of nearly all the East Greenwich people, and there would be two stations with about 300 attendances a-year at each, instead of one with 500. Now the present number is the smallest that can be satisfactorily worked, in order to ensure a good choice of babies from whom to vaccinate, and to keep up continuous arm-to-arm vaccination throughout the whole year, and this direct vaccination is the very essence of the success attained.

6. Of the amount of success.—Tables III. and IV. show that the total number vaccinated has been 2,976 ; and that 2,946 have been successful and 30 unsuccessful. Of the 30 failures, 26 were vaccinated a second time, and were then successful, so that they are counted twice over—once as unsuccessful and once as successful ; of the remaining four, one died of bronchitis two days after vaccination, one was attacked with erysipelas,

one with eczema, and the remaining one with diarrhoea a day or two after the vaccination, which failed in consequence. The one attacked with erysipelas died, as mentioned further on; in the other two, the second vaccination was postponed, and the children lost sight of. *I have never yet met with a case of insusceptibility to vaccination, or had to sign a certificate to that effect.*

Referring again to Table III, we find that of the total failures of 30, 16, or more than one-half, occurred in the year 1871, and 9 of these 16 happened in the quarter ending Lady-day. Now this is accounted for by the fact that, during that year, and especially that quarter, the Metropolis was passing through a severe epidemic of small-pox, and the resources of the station were greatly taxed, the supply of lymph frequently running very short; for not only did considerable numbers of people present themselves for re-vaccination under the influence of panic, but many medical men, residing in the neighbourhood and at a distance, applied to the station for lymph, and took away as much as could be spared. Consequently, I think it only just that the year 1871 should be eliminated from my averages, and likewise the first seven months in 1870, during which I was gaining experience in conducting the station and in vaccinating generally.

Taking, therefore, the results of the last four years only (Table V.), which I consider fairly represent my present work, we have 9 failures in 2,162 cases, or 1 in 240. In 1872 and 1874, with 552 and 523 vaccinations respectively, there were no failures at all; in 1873, there were 7 failures out of 545 cases, or 1 in 78; and in 1875, there were 2 out of 542, or 1 in 271. Now Mr. Marson states—"That an expert vaccinator should not fail of "success, in his attempts to vaccinate, above once in 150 times;"* and Dr. Seaton writes—"That this is not at all too high a standard "is manifest from the results which, on examination of the records "kept at some of the stations of the National Vaccine Establish- "ment, I find to have attended their practice. The failures were

* Medico-Chirurgical Trans. Vol. XXXVI.

“on the average of a large number of cases, spread over a considerable time, but 1 in 170.”* The success, therefore (1 failure in 240 cases) is considerably in advance of these standards.

7. Of the degree of success.—Tables VI. and VII. show the number of cases in which 8, 7, 6, 5, 4, 3, 2, and 1 vesicles were produced, respectively.

It is necessary here to explain that I commenced by vaccinating in six places, three on each arm, and continued this practice until Christmas, 1871, when, in consequence of the great and continued objection of the mothers to having both arms sore at once, I gave it up, vaccinating thenceforward on one arm only, in five places. A glance at Table VI. will show when the change was made. The seven or eight vesicles recorded as being sometimes produced, were merely accidental—occasioned sometimes by the restlessness of the infant causing an extra scratch, or by having vaccinated a *nævus*.

It will be seen (Table VII.) that, out of 2,946 cases successfully vaccinated,

2,840 (or 96·4 per cent.) took in 4 or more places,

68	„ 3 places,
21	„ 2 places, and
17	„ 1 place,

or of the latter, 1 in 173 cases.

The proportion is still better if, for reasons already given, we take the last four years only ; then, out of 2,153 cases,

2,100 (or 97·5 per cent.) took in 4 or more places,

31	„ 3 places,
11	„ 2 places, and
11	„ 1 place,

or of the latter 1 in 196 cases.

Examining this by Dr. Seaton's standard, we find he states—
 “With regard to the *degree* of success, it appears from the records
 “of the stations above referred to (National Vaccine Establish-
 “ment), that in their practice, vesicles had risen at *every* point

* Handbook of Vaccination, Dr. Seaton, p. 161.

“ of insertion of lymph, in considerably more than 90 per cent.
 “ of the children operated on, whilst the proportion of cases in
 “ which a single vesicle only had resulted from the four, five,
 “ or more, insertions made was but one in a hundred.”* The
 success, therefore, is again in advance of this standard.

8. Of the quality of success.—Anyone conversant with vaccination knows that different arms present very different appearances on the eighth day: some have beautifully pearly vesicles on a white ground of skin, or with the skin just slightly reddened—the *typical* state; in others the surrounding skin is reddened to a considerable distance, in consequence of the *premature* formation of the areola; in others, again, this redness is excessive and runs on to *inflammation*. On the other hand, some vesicles are not so full and plump as they ought to be, being *retarded* in their development; others, again, from carelessness in handling the infant, have the tops of the vesicles entirely *rubbed off*. Of course one always strives to obtain the *typical* result, and the slightest carelessness in the selection of the lymph, will lead far more frequently to the premature, or inflamed state, than to the retarded.

In order to keep a record of these variations, two years ago, I adopted the plan of inserting a letter in the register, after the figure indicating the number of vesicles produced, on the scheme and with the result shown in Tables VIII. and IX. The 30 cases not reported mostly occurred whilst I was away for a holiday, and my deputy did not understand my plan of registering with a letter. The greater part of them were A, or typical, and I think 25 may be fairly so considered. Adding this number to the 670 recorded as typical, we have 695 out of 1,063, or 65 per cent., perfect in quality; then, again, 85 were rubbed, and the greater part of these would have been typical but for this accident or carelessness. There have been 143 prematurely developed, only 51 really inflamed, and not one with a very excessive amount of inflammation.

* Handbook of Vaccination, Dr. Seaton, p. 161.

This plan of registering not only shows the quality of the vaccination, but it enables one to trace out the imperfections, and is a great help in other ways. For instance, if one baby's arm be inflamed, it will very likely be found that several others done from the same source are inflamed likewise; and, again, if at the end of a week or two the infant be brought with its arms sore and unhealed, it is a great satisfaction to learn from the register the state of the arm on the day of inspection—that it was then found to be rubbed, for instance, and that the soreness is due to the mother's or nurse's carelessness; or should the child perchance come out with one of the rashes hereafter enumerated, to find that its arm was prematurely developed or inflamed (as is frequently the case); and I am pleased to find that Dr. Seaton has proposed to make a record of this kind compulsory on all public vaccinators,* although he has not specified the exact means of carrying it out. I was not aware of his proposition at the time I adopted the plan, and, as far as I can learn, it has never hitherto been actually put into practice by any other vaccinator.

9. Of grants.—Two of these have been received from the Local Government Board, for efficient vaccination, out of the money voted by Parliament for that purpose: one in 1873—a second-class award, amounting to £34 11s.; and one in 1874—a first-class award, amounting to £50 3s.





10. Of the method of performing the operation of vaccination.—When I first commenced vaccinating at the station, I operated in the way I had been taught, by simple puncture with the point of the lancet; as this method, however, gave small resulting vesicles, I gradually added scratches as well, and about the end of 1871 gave up the puncture entirely, and resorted to scratching alone.

My present method is as follows:

The baby from whom the lymph is to be taken, or the *vaccinifer*, as it is called, being placed on one side of me, and the baby about to be vaccinated on the other, I carefully open the

* Report of Select Committee on Vaccination Act (1867), p. 434.

vesicles of the vaccinifer with a very sharp lancet, taking care not to draw any blood, and when the clear lymph exudes in little beads, I pick this up by means of a Dr. Husband's capillary tube, until the tube is about one-third full. I prefer picking up with a tube to the usual mode of scraping the vesicles with a lancet for this purpose, as then all tearing of the vesicles is avoided, the lymph is obtained perfectly pure, free from pus globules, epithelial scales, or blood discs (if any should have accidentally appeared), and, moreover, a supply can be collected from several different vesicles, if it be small or running short; and I have certainly had fewer resulting inflamed arms since I adopted this plan—doubtless in consequence of the extra purity of the lymph, and its freedom from the products of inflammation contained in the centres of the vesicles. As the saying goes, there is nothing new under the sun: so I find that Dr. Gentles, public vaccinator of Derby Union, has followed this plan for years, having, unknown to me, travelled the same road and arrived at the same conclusion, and apparently preceded me in its application.

The lymph thus collected is blown at once on to the point of another lancet, and the arm of the infant to be vaccinated scratched thus , and then crossed in this manner , or in a kind of scribble , crossed thus , so as just to draw blood. This scratching is repeated without a fresh charge of lymph, in five different places, about half an inch apart, in the pattern of a five of diamonds—four in a square and one in the centre—just over the insertion of the deltoid muscle on the left arm. The lymph is then well rubbed into all the places with the side of the lancet, and left to dry.

For operating in this manner, there is no occasion to have a very sharp lancet: in fact, I prefer one somewhat blunt, or even a little turned at the end.

Before proceeding to vaccinate another infant, the lancet is washed in a cup of water and dried on a cloth.

As the foregoing pages testify, the success of this method of operating is very great, a large compound vesicle, about twice the

area of the scarification depicted above, results from each insertion of lymph; but one of its chief advantages is that little or no blood is drawn—a matter very difficult to avoid in operating by simple puncture; and, although bleeding does not detract from the success of the operation, yet it produces unpleasant effects on the minds of mothers, and is therefore to be avoided, if possible.

11. Of the selection of the vaccinifer.—As far as practicable, attention is paid to the following rules:—

1. To choose a baby with a typical arm, free from areola.
2. One whose parents are personally known to me.
3. One in a perfect state of health at the time.
4. One of a large family, all the rest being reported alive and in good health.
5. One under three months of age, before the troubles of teething have set in.
6. One with dark hair, brown eyes, and a smooth skin, in preference to a fair-haired, blue-eyed, scrofulous child.
7. To avoid illegitimate children.

It is manifestly frequently impossible to unite all these desirable qualities, but they are the points constantly kept in view.

12. Of inspection after vaccination.—The numbers who fail to bring their infants for inspection on the eighth day are very few. On the day of vaccination, each parent or guardian is given a card, as follows:—

VACCINATION STATION, LECTURE HALL, GREENWICH.

_____ *having this day
been vaccinated, must, on this day week, at Two
o'clock, be brought back for inspection, in order that the result
of the Vaccination may be seen and certified.*

*If the child be not so brought back, the Parent or Guardian is
liable to a Penalty of £1.*

J. P. PURVIS,*

Public Vaccinator.

Date _____ 187

* In future this will be the signature of the Vaccination Officer.

and for weeks together there is not a defaulter. When one fails to come, the name and address is forwarded to the vaccination officer, who sends the parent or guardian a notice, in the first instance by post, and generally the infant is brought up the following week. If it be ill, I myself call and inspect it at home. The number of those who escape inspection altogether is extremely small—only one last year, and but ten in the whole period, seven of which occurred in the first six months in 1870, before the appointment of a vaccination officer. In all these cases, the parents removed from the neighbourhood before the day of inspection: one family emigrated, and the rest, I believe, went hop picking.

13. Of the value of the vaccination officer.—

This appointment was first made in May, 1872, and it will be seen (Table III.) that, since that date, there has been a marked decrease in the age at which the children have been brought.

In 1871, out of 538 cases, there were 228 over six months.

	„	1872,	„	552	„	„	164	„	„
Whilst	„	1873,	„	544	„	„	40	„	„
	„	1874,	„	523	„	„	34	„	„
And	„	1875,	„	543	„	„	28	„	„

Of course, if the vaccination officer do his duty, these numbers should consist mainly of removals into the district and postponements, and should bear a very small proportion to the total number.

14. Of the distribution of lymph.—

Most of the medical practitioners of the neighbourhood have, at one time or another, applied to the station for lymph and been supplied gratuitously. Several medical men at a distance have likewise received supplies from me. I beg here to assure them that I shall at all times be most willing to let them have as much as can be spared, and hope that, in return, they will send to the station, to be vaccinated, such of their poorer patients as are unable to afford a fee for the operation.

On one or two occasions I have run short of lymph myself, and have then applied to Dr. Downing, of Deptford, who has

always most kindly and willingly supplied me with all that I required.

15. Of the preservation of lymph.—For distribution, and for use in the re-vaccinations to be presently described, I use solely Dr. Husband's capillary tubes, and find that those obtained direct from Edinburgh are very greatly superior, both in regularity of bore and toughness of glass, to those of any English maker.

Formerly, I used to keep these tubes, when charged, on slips of card, as recommended by Dr. Husband, on which were written the register-number of the infant from whom the lymph was taken, and the date, but so many got broken that I could not stand the loss, and consequently designed and had made a case to hold them—*vide* frontispiece. It is something like an enlarged homœopathic case, and contains long, narrow bottles for the tubes, and labels on which to write the register-numbers, &c. A glance at the sketch will show the arrangement. The contents are—

- 19 little bottles for charged tubes.
- 1 large bottle for uncharged tubes.
- 1 do. for charged tubes when the 19 are full.
- 1 small bottle for glycerine.
- 1 do. for uncharged points.
- 1 do. for charged points.
- 1 little box for wax vestas.
- 1 do. for labels and corks.
- A watch-glass and lancets.

The case answers its purpose admirably, and is far superior to cards.*

16. Of sequelæ.—There are certain infants, particularly those of a scrofulous habit—the fair-haired, blue-eyed, smooth and fair-skinned pretty babies already alluded to—in whom the first irritation, no matter what, whether it be teething, the scratch

* The case can be obtained from Messrs. Arnold and Sons, 35 and 36, West Smithfield, London, with whom I have made arrangements for bringing it out.

of a pin, worms in the intestines, or vaccination, will bring out a rash. I have seen the application of a simple piece of sticking-plaster to a cut lip light up a rash which afterwards spread over the whole body, and this liability to eruptions is frequently hereditary. Hardly a week passes but that I have to postpone vaccination for a month or two from this cause, and in many of these instances the rash had only just shown itself—perhaps a day or two previously. A very instructive incident occurred to me a few months back: a woman brought her baby, then apparently in perfect health, to be vaccinated, she was late, and all the vaccineinifera had left, so I sent her away, and told her to come again the next week; the following week she brought the infant covered with impetiginous eezema—its scalp was one mass of oozing sore. In this case, vaccination had a very narrow and lucky escape, for had I vaccinated that baby the previous week, as I should have done but for the mere accident of its being ten minutes late, the eruption would have been put down to the vaccination, by the father, mother, friends, and neighbours. So that it does not at all follow, because the rashes enumerated (Table X.) came out after vaccination, that they were a consequence of it; in fact, I am quite certain that, with many of them, the appearance just at that time was a coincidence, and nothing more.

It will be seen that there have been but twenty-five cases altogether; and, as each parent or guardian is given a card on leaving the Station, of which the following is a copy, I feel certain that I have heard of nearly all the cases that have occurred.

DIRECTIONS FOR TREATMENT AFTER VACCINATION.

Take particular care that the arm be not rubbed, and that there be nothing tight ABOVE it: it is a good plan to leave the arm entirely out of the sleeves.

Leave the vesicles to dry into scabs, and the scabs to fall off of themselves.

Do not Poultice.

Remember that the arm will naturally become red and inflamed by the end of the 8th, and on the 9th and 10th days after Vaccination; should it become very much inflamed, dress it with some REAL CREAM, or cover it with FLOUR OR FINELY POWDERED STARCH, and give the Child a tea-spoonful of castor oil.

If the arm do not go on favourably, the Child should be brought to Mr. PURVIS, at his Surgery, Royal Hill, Greenwich, any morning at 10 o'clock.

There may have been one or two cases of trifling eruption, such as vaccine lichen, that they have not thought it worth while to come about, but, as a rule, parents are only too ready, if they have a chance, to come and accuse one of putting bad or foul matter (as they term it) into the baby.

(a) **Vesicular Eruption.**—That this was really *chicken pox* I think highly probable; it greatly resembled that disease, and would certainly have been diagnosed as such, but for its appearance about a fortnight after vaccination.

(b) **Erysipelas.**—By far the most serious sequel of vaccination is erysipelas, and this constitutes a real, and, as far as my experience goes, the only true danger attending it. Of erysipelas there have been seven cases, and three of these have unfortunately died.

Now, erysipelas will sometimes occur in any wound, no matter how trifling. The scratch of a pin, or the puncturing of an ear for an ear-ring, has before now been followed by erysipelas and death; so, in the same way, it may occur in the scratch of vaccination, simply because it is a wound, and not because of the vaccination *per se*.

Two out of the three deaths happened to two infants in succession in the same family (Nos. 6 and 8). The first child distinctly caught the erysipelas from a sister, who had just returned from hospital, where she had been with erysipelas of the face, and I have every reason to believe, that the second infant wore the same clothes as the first, who had died eighteen months previously, and that these clothes, being infected, gave the second the same disease. Strange to say, since I commenced this Report, the mother has brought a third infant to have the vaccination postponed; and, on my questioning her about the clothes, acknowledged that they had not been destroyed.

No. 5 caught erysipelas three days after vaccination, and the operation was in consequence unsuccessful, the child dying in eleven days.

The remaining four all recovered, although some of them had a narrow escape.

(c) **Treatment of Sequelæ.**—The *simple rashes* get well in a week or two with a little saline mixture, a few aperient powders, and the local application of some simple or zinc oint-

ment. For *erysipelas*, the treatment that I have found most efficacious is to lightly run the solid nitrate of silver stick beyond the edge of the inflammation, round the top of the arm, and under the armpit, so as to completely encircle the arm, and isolate it from the rest of the body. In some of the cases of recovery, the inflammation ran right up to the nitrate of silver line, but never crossed it; if the disease can be prevented from extending to the trunk, and kept localised in the arm, I believe there is no danger to life. In all the cases of death, the mode has been the same, the inflammation spreading over the chest, and the child dying with symptoms of effusion into the pleural cavity.

Flexible Collodion (Collodion Flexile), painted on night and morning, is, I believe, the best application to the inflamed skin. From drugs I have found no benefit, although I have tried a variety, including tincture of perchloride of iron, ammonia, ammonia and bark, &c.

17. Of the non-conveyance of other diseases by vaccination.—Bearing on this question, the following have occurred to me.

On August 9th, 1871, I vaccinated five infants from a child apparently in perfect health. In the January following, this child was brought to me at the Dispensary, suffering from a copper-coloured squamous eruption, the snuffles, and other symptoms of congenital syphilis, and, to my horror, the mother reminded me that I had vaccinated the child, and the ensuing week had vaccinated five others from it.

On returning home, I at once referred to my Registers, and, finding that such was the case, forthwith called on the five done from this source. I was successful in tracing four, and was rejoiced to find that they were all in perfect health, that the arms had healed well, and that none of them had suffered from any, even the most trifling eruption, since vaccination. I can only consider that the escape was due to the scrupulous care with which I avoid the taking of any blood; and I believe that the plan resorted to of picking up the lymph with a tube is a great assistance in gaining this end.

I have also inadvertently vaccinated from an infant suffering from whooping-cough, without conveying that disease.

Of course, a surgeon would never knowingly vaccinate from a

a child suffering from syphilis, whooping-cough, or any other ailment; but, from my experience, I am firmly convinced that, *provided nothing but vaccine lymph be used, and the taking of any blood carefully avoided, nothing but vaccinia can be conveyed from one person to another.*

Vaccine is vaccine, and nothing else, and is capable of propagating itself, and producing vaccinia on the human subject, apparently indefinitely, in the same way as the poison of small-pox, of scarlatina, of measles, of typhus, and enteric fevers, propagates small-pox, scarlatina, measles, typhus, or enteric fever, as the case may be.

I presume that no one would dream of asserting that because he caught small-pox or any other zymotic disease from a person in consumption, for instance, that therefore he had caught the consumption as well; and yet, forsooth, this is precisely what the anti-vaccinators would have us believe of vaccinia.

18. Of re-vaccination.—It will be seen from Table XI., that re-vaccination in Greenwich, is entirely in abeyance, for the three persons done in the last two years were all suffering from consumption, and about to be admitted into the Brompton, or Victoria Park Hospital, both of which institutions require patients to be re-vaccinated previous to admission. Of the total number of 229 cases, 195 succeeded, and 34 failed, or 14·85 per cent., at the first attempt.

Of the 34 failures, 26 were re-vaccinated a second time, the remaining 8 refusing to be done again; and of the 26 so re-vaccinated, 17 were successful, and 9 unsuccessful, giving a total failure of $8+9=17$ out of 229 cases, or 7·43 per cent.

19. Of the method of performing the operation of re-vaccination at the station.—This has been the same as that adopted for infants, viz., by scratching and well rubbing in the lymph, only I have been contented with producing four vesicles instead of five.

20. Of the complete immunity from small-pox conferred by re-vaccination.—This entire neglect of re-vaccination by the public is a matter greatly to be deplored, when we consider the following evidence of its value.

Dr. Grieve, Medical Superintendent of Hampstead Hospital, in a paper read before the Epidemiological Society in 1872, says:

“ I wish it were possible to bring home to the minds and the belief of the general public my conviction regarding re-vaccination, viz., *that it is a sure protection against small-pox.*”*

And a Report of a Special Committee of the Metropolitan Asylum District Board contains the following, which I venture to quote *in extenso*, as it is a powerful weapon for use against the anti-vaccinators, *et hoc genus omne* :—

“ No greater argument to prove the efficacy of this precaution (re-vaccination) can be adduced than the fact that, out of upwards of 14,800 cases received into the hospitals, only 4 well authenticated cases were treated in which re-vaccination had been properly performed, and these were light attacks. Further conclusive evidence is afforded by the fact that all the nurses and servants of the hospitals, to the number at one time of upwards of 300, who were hourly brought into the most intimate contact with the disease, who constantly breathed its atmosphere, and than whom none could be more exposed to its contagion, have, with a few exceptions, enjoyed complete immunity from its attacks. These exceptions were cases of nurses or servants whose re-vaccination, in the pressure of the epidemic, was overlooked, and who speedily took the disease; and one case was that of a nurse who, having had small-pox previously, was not re-vaccinated, and took the disease a second time.”†

So we find Dr. Seaton writing : “ It would indeed greatly conduce to the security of the public against future small-pox epidemics if some means could be taken for giving effect to a rule which I ventured to lay down some years ago, and of the practical importance of which each year’s experience has more and more convinced me, that the re-vaccination of persons as they reach about fifteen years of age should be as systematically done as is the vaccination of young infants.”‡

In 1871, in the midst of the epidemic, the public rushed in overwhelming numbers to be re-vaccinated, and the result was, not only at my station, but throughout London, an insufficient

* The italics are Dr. Grieve’s own.

† Report of Special Committee of Metropolitan Asylum District Board, presented to Managers 13th July, 1872.

‡ Reports of the Medical Officer of the Privy Council, and Local Government Board, New Series, No. iv., p. 98.

supply of lymph for the purpose, and, what is of far more serious consequence, a deterioration in the quality of the primary vaccinations, as shown by Table III., and already alluded to.

21. Of the re-vaccination of "Fisgard" boys.—

Attached to the station is the re-vaccination of the recruits for the Navy from the port of London received on board H.M.S. *Fisgard*.

Table XII. shows that they commenced on August 14th, 1872, and that since that date 2929 re-vaccinations have been performed; of these, 2769 have been successful, and 160 unsuccessful, or a failure of 5·47 per cent.

I do not inspect any of these arms myself, as the boys are drafted away to other ports, frequently within a few days of the vaccination, and they are inspected and reported upon by the medical officer of the port to which they are sent; on this report I am paid by the Admiralty for all successful cases. I have reason to believe that all those arms which show a sign of a vesicle on the eighth day, no matter how modified, are returned as successful. I have no statistics to present of the previous vaccination of these boys, but speaking from memory, I can state that as a rule they have been remarkably well vaccinated in infancy, probably from their position in life, at a public station, and many of them have been re-vaccinated previously, some even more than once.

No sequelæ whatever have been reported to me as occurring amongst them; and I am certain that had anything at all serious arisen, it would have been brought to my notice.

22. Of the Method of performing the operation of re-vaccination on "Fisgard" and Royal Hospital School boys.—For obvious reasons, this cannot be done direct from the arms of infants, for the numbers are so great, and some of the recruits such *rough customers*, that the station would be put into inextricable confusion were the boys brought into contact with the mothers. Recourse is therefore had to tube lymph. The contents of well-filled capillary tubes, in the proportion of one tube to two boys, is blown out into a watch-glass, or inverted bottom of a wine-glass, and then *mixed with an equal quantity of glycerine*. The mixture of lymph and glycerine being inserted into the arms in the manner previously described, viz., scratching, and well rubbing in to four places.

The glycerine answers two purposes: (1) it prevents the lymph from drying up; (2) it increases the quantity, and enables it to be used more freely, and a larger amount rubbed in. At the same time, it does not *seem* to impair the efficacy of the lymph, but rather to add to it; for my success is quite equal to, in fact somewhat above, that usually met with in re-vaccination.

Although, as I have just stated, I do not inspect any of these arms myself, and cannot, therefore, speak as to their quality, I feel certain that it is very good, for in similar re-vaccinations done in a like manner with lymph from my station mixed with glycerine, and performed by my friend Mr. G. W. Armstrong and myself on all the boys entering the Royal Hospital School, the success is even greater, as shown in Table XIII.; from which it will be seen that of 1014 re-vaccinations, 978 have been successful, and 36 unsuccessful, or a failure of only 3·55 per cent.

Most of these school-boys I *do* inspect myself, and can therefore vouch for the quality of the results: fully 50 per cent. take in so typical a manner that it is almost impossible to distinguish them from primary vaccinations.

It is necessary here to add, that this admixture with glycerine does not answer, as far as my experience goes, for infants. I once tried it, and had a series of partial failures, many of the vesicles on the eighth day being broken; it seemed as though the glycerine softened the tender cuticle of the infant, and rendered it unable to rise into a vesicle. In adolescents and adults, the cuticle being harder and more developed, this does not happen; at least, I presume this to be the explanation.

23. Of fainting after re-vaccination.—There is one curious circumstance that sometimes attends the vaccination of the *Fisgard* and Hospital boys, and deserves a passing notice, and that is, fainting after the operation; now and then, a strong healthy lad, immediately on being vaccinated, will fall down on the floor in a dead faint, frequently associated with convulsions of an epileptiform character. I have found this occur also amongst private patients, and much more frequently in men than in women; in fact, I cannot recall to mind any woman or girl having so fainted, and during the epidemic of 1871 I re-vaccinated several large girls' schools.

This fainting partakes of the character of shock, and is also to

a certain extent mental, for so sure as one boy "goes off," several others are tolerably certain to follow. I have had as many as six out of a batch of thirty laid on their backs at the same time. It is not due to the pain of the operation, for that is infinitesimal; and, moreover, whenever it happens, I ask, "Did it hurt you so much?" and the invariable answer is, "Hardly at all; and I cannot account for feeling so queer."

24. Of the necessity of producing in vaccinating a large number of vesicles.—The foregoing pages contain the whole of my experience at the station; but I feel that this Report would be still incomplete, were I to omit to add some cogent reasons why I produce so large a number of vesicles as five, as otherwise this amount might be considered excessive, and therefore cruel to the infants, and likewise the mothers who have to nurse them; in fact, I am aware that in some quarters five places is still considered an unnecessary number. Formerly it used to be held that, in order to obtain protection from small-pox, all that was necessary was to have the modified form of vaccinia, and that, as one vesicle gave the vaccine disease, one place was as good as a dozen. At the first blush, this argument seems sound, but experience proves that it is not so. What I may term the crucial test of the protective power of vaccination—actual contact with the small-pox poison—shows conclusively that, in order to obtain from it the full protection against small-pox that it is capable of imparting, it is necessary not only to have vaccinia, but to have it (as it were) with a certain degree of severity. The experience of small-pox, both as it occurs in ordinary seasons sporadically, and occasionally in an epidemic form, has now demonstrated with the utmost certainty that the greater the amount of vaccination, that is to say, *the larger the number of marks on the arm, and the better their quality, the greater is the protection afforded against small-pox, and the lower the percentage of death.*

(a) **Mr. Marson's experience, 1836-67.**—Mr. Marson, Surgeon to the London Small-pox Hospital, Highgate, was the first to draw attention to this fact, in his now historical paper read before the Medico-Chirurgical Society.* The following table is abstracted therefrom. It is drawn from

* Medico-Chirurgical Transactions, Vol. xxxvi., p. 369.

observations on 3094 cases of small-pox admitted into the above hospital during the sixteen years from 1836 to 1851 inclusive :—

Classification of Patients affected with Small-pox.				Number of Deaths per cent. in each Class respectively.
1. Unvaccinated	...	...	...	35·55
2. Stated to have been vaccinated, but having no cicatrix	...	...	...	21·73
3. Vaccinated :				
<i>a.</i> Having one cicatrix	...	...	...	7·57
<i>b.</i> Having two cicatrices	...	...	...	4·13
<i>c.</i> Having three cicatrices	...	...	...	1·85
<i>d.</i> Having four or more cicatrices	...	...	...	0·74
<i>A.</i> Having well-marked cicatrices	...	...	...	2·52
<i>B.</i> Having badly-marked ditto	...	...	...	8·82
4. Having previously had small-pox	...	...	...	19·00

Mr. Marson has since taken observations for another period of sixteen years, from 1852 to 1867, during which 13,670 cases were under treatment. The two series embrace together a period of thirty-two years, and observations on upwards of 16,000 cases. Substantially the figures during the second period are the same as during the first. I wished to add them here, but Mr. Marson has requested me not to do so, as he intends shortly to publish them himself, together with those taken during the epidemic of 1871 ; and, as they have occupied a portion of his time every day for sixteen years to obtain, he is naturally desirous of bringing them before the public in his own way. He, however, gave the results of the second series in his evidence before the Select Committee of the House of Commons on the Vaccination Act (1867), and any one interested in the subject will find them in the Blue Book, page 237.

(b) **Dr. Seaton's opinion, 1867.**—Then we find Dr. Seaton writing in 1867 : “ In order that persons should have from
“ vaccination the fullest protection against small-pox which it is
“ capable of imparting, it is necessary that it should not only be per-
“ fect in character, but that it should be sufficient in amount—that
“ the system should not only be infected, but that it should be well
“ infected. * * * * Persons whose vaccination has resulted
“ in their having one genuine vaccine vesicle, and one only, are, as a

“ class, much less protected than those who have had two, those who
 “ have had two than those who have had three, &c., and the protec-
 “ tion against fatal small-pox which is afforded by four or more
 “ genuine vesicles is almost absolute. * * * * And, now that
 “ the fact is well established, it is not too much to affirm, that no
 “ practitioner will have done his duty, in any case in which he is called
 “ upon to vaccinate, unless, besides taking all requisite precautions
 “ with regard to the genuineness of the lymph he employs, and
 “ the means of insuring success, he has also taken care to vac-
 “ cinate sufficiently, *i. e.* to produce, so far as in him lies, four or
 “ five genuine good-sized vesicles, such as result from separate
 “ punctures; or, if vaccinating otherwise than by separate punc-
 “ ture, to produce equivalent local results.”*

(c) **Experiences of the Epidemic of 1871.**—Since the foregoing were published, a wave of small-pox of intense epidemic influence has swept over the kingdom, and, as was to be expected, we find Mr. Marson’s observations most fully confirmed.

From Hampstead, Homerton, and Stockwell Hospitals, from Merthyr Tydvil, Glasgow, and Leeds—in fact, wherever accurate observations have been taken and published—we have the same facts most strikingly brought out, as will be seen by the subjoined evidence.

(a) **Returns from Hampstead, Homerton, and Stockwell Hospitals.**—The first column of the following table is taken from a paper read before the Epidemiological Society in May, 1872, by Dr. Grieve, and is drawn from observations on 3,555 cases of small-pox treated in the Hampstead Hospital during the epidemic of 1871. The second column is taken from the Report of the Special Committee of the Metropolitan Asylum District Board already referred to, and is drawn from the observations of the Medical Superintendents of the Hampstead and Stockwell Hospitals on 5,539 cases of small-pox during the same epidemic.

* Handbook of Vaccination, Dr. Seaton, p. 215, *et seq.*

Classification of Patients affected with Small-pox.	Number of Deaths per cent. in each Class respectively.	
	1*	2†
1. Unvaccinated	55.43	55.9
2. Vaccinated :		
<i>a.</i> Having one cicatrix	17.39	15.2
<i>b.</i> Having two cicatrices	13.29	11.7
<i>c.</i> Having three cicatrices.....	10.58	9.4
<i>d.</i> Having four cicatrices	8.38	6.5
<i>e.</i> Having five or more cicatrices.....	6.13	5.5
<i>A.</i> Having well marked cicatrices.....	} not stated	3.9‡
<i>B.</i> Having badly marked cicatrices ...		25.0‡

The numbers in the first column are, I believe, included in the second, but I have no means of separating them.

(*b*) **Return from Merthyr Tydvil.**§—Mr. Dyke, the Medical Officer of Health for Merthyr Tydvil, from records of *every case* of small-pox, fatal or not, known to have occurred in his district during the epidemic 1871-72, has published the following return.

Classification of Patients affected with Small-pox.	Number of Deaths per cent. in each Class respectively.	
	1	2
1. Unvaccinated	51.1	
2. Vaccinated :		
<i>a.</i> Having one cicatrix	8.5	
<i>b.</i> Having two cicatrices	6.0	
<i>c.</i> Having three cicatrices	3.7	
<i>d.</i> Having four cicatrices	1.5	
<i>e.</i> Having five or more cicatrices (22 cases)	none died	

(*c*) **Return from Glasgow Fever Hospital.**§

1. Having well marked cicatrices	3.8
2. Having badly marked cicatrices	21.

* Paper read before the Epidemiological Society, by Robert Grieve, M.D., in May, 1872.

† Report of Special Committee of Metropolitan Asylum District Board, presented to Managers 13th July, 1872.

‡ These figures are taken from the same Report, but from a different return, viz., one from Homerton and Stockwell.

§ Reports of the Medical Officer of the Privy Council, and Local Government Board, New Series, No. iv., pp. 90 and 91.

(d) Return from Leeds Hospital.*

- | | | | | |
|-----------------------------------|-----|-----|-----|------|
| 1. Having well marked cicatrices | ... | ... | ... | 2·75 |
| 2. Having badly marked cicatrices | ... | ... | ... | 12· |

It will be noticed that during the epidemic the percentages of death were considerably higher than Mr. Marson's, due, no doubt, partly to the malignancy of the epidemic, and partly to the cases of death from superadded diseases, as far as I can learn, not having been deducted, as they were by Mr. Marson, but the same relative protection in the number of marks holds good.

The great malignancy—the fatal character, of the small-pox epidemic of 1871 was likewise felt at Highgate, where, Mr. Marson informs me, the percentage of death in the unvaccinated was 66·2, and in the vaccinated (of all kinds) 13·9, both these figures being nearly double the number of a series of previous years.

(e) Even the **duration of the disease** in those who recover bears a direct ratio to the number and quality of the vaccination marks, as witness the following, taken from observation, by Dr. P. H. McKellar, on 328 cases of small-pox admitted into Stockwell Hospital from 27th December, 1871, to 30th April, 1872, and who recovered. It will be seen that the average stay in hospital decreased from 39 days in the unvaccinated to 20 days in the well vaccinated. Dr. McKellar also states that 48 cases without vaccine marks had a collective residence in hospital of about 728 days more than 56 cases with two, three, or more good marks.

Character of the Vaccination.							Average stay in Hospital in Days.
1.	Having no marks	...	...	...	...	...	39·1
2.	Having bad marks:						
	a. One	...	...	...	...	...	27·5
	b. Two	...	...	...	...	...	25·
3.	Having good marks:						
	a. One	...	...	...	...	...	23·7
	b. Two	...	...	...	...	...	21·6
	c. Three or more	...	...	...	...	...	20·

* Reports of the Medical Officer of the Privy Council, and Local Government Board, New Series, No. iv., pp. 90 and 91.

25. Of the insufficiency of vaccination as ordinarily performed by private practitioners.—Notwithstanding this weighty evidence, and this mass of accumulated and daily accumulating facts, the necessity of a large amount of vaccination does not seem yet to have come home to the minds and the belief of the great bulk of the medical profession (as evidenced by their practice). The words of Dr. Seaton (to again quote that high authority) express this far more forcibly than any of mine could do; and, although written in the past tense of the vaccination, public as well as private, found to exist in 1860-64, they are equally applicable to the private vaccination of the present time. He states: “It was found that the “great majority of vaccinators were still content with endeavours to produce sometimes one, more frequently two, and “at the utmost three, vaccine vesicles. Practitioners who had “vaccinated in this way all their lives, especially if in their “own (very limited) experience they might not have chanced “to see any fatal small-pox in persons whom they had so “vaccinated, ‘couldn’t see why’ they should change their “practice, or ‘why’ one vesicle shouldn’t be as good as a “dozen; and others, who were willing to make a change, had “*their* troubles, sometimes in the prejudices of parents, who, “having been in the habit of seeing one or two insertions of “lymph only made on children’s arms, could not for their parts “‘see why’ the doctor should be introducing new-fangled ways.” And in a foot-note, writing of the vaccination of to-day, he says: “It is disagreeable to speak, but I feel it a duty to do so, of the “very imperfect way in which, to my own knowledge, *private* “*vaccination* is not unfrequently done. Especially it has been “brought to my notice on several occasions, that in certain “districts in which medical competition of a low character is “carried on, there are practitioners who bribe (as it were) parents “not to attend the public vaccination stations by the offer to “vaccinate the children imperfectly, *i. e.*, in one or two places “only.”*

Now, this imperfect vaccination, apart from its being very unfair to the public vaccinator, is a serious matter; for, in times of

* Reports of the Medical Officer of the Privy Council, and Local Government Board, New Series, No. iv., pp. 92 and 93.

epidemic small-pox, the disease finds out these insufficiently protected persons, they take it in a more or less modified form perhaps, a certain percentage of them die, and discredit is cast upon vaccination.

26. Conclusion.—In conclusion, Gentlemen, there are two practical deductions to be drawn, I think, from the evidence at present in existence, and some of which I have adduced herein.

Firstly, it would seem desirable that a clause should be inserted in the next amendment to the Vaccination Acts, legally defining the number of vesicles necessary to constitute vaccination, and fixing four as the minimum number that a medical man should at all events *attempt* to produce.

Secondly, that re-vaccination at puberty, say at about fifteen years of age, should be made as compulsory as the present primary vaccination is.

Were it possible to enforce by legal enactment or otherwise these two all-important points, we might hope that the next wave of epidemic small-pox would find a population all but insusceptible to its influence.

Lastly, there are four points in my practice to which I wish to direct especial attention.

1. The picking up the lymph from the opened vesicles of the vaccinifer, by means of a capillary tube.

2. The registration of the character of the vesicle on the eighth day, by means of a letter.

3. The keeping of charged tubes in little bottles in a case, instead of on slips of card.

4. The mixing of an equal quantity of glycerine with lymph for re-vaccinations.

Hoping that this Report may be read with interest, and prove acceptable to you, although it has grown as I have proceeded, and has reached a far greater length than I originally intended it to do,

I have the honor to remain,
Gentlemen,

Your obedient Servant,
J. P. PURVIS.

Royal Hill, Greenwich,
February, 1st, 1876.

*Copy of Letter received from the Guardians after the presentation
of the foregoing Report.*

GREENWICH UNION,
GREENWICH, S.E.
14th March, 1876.

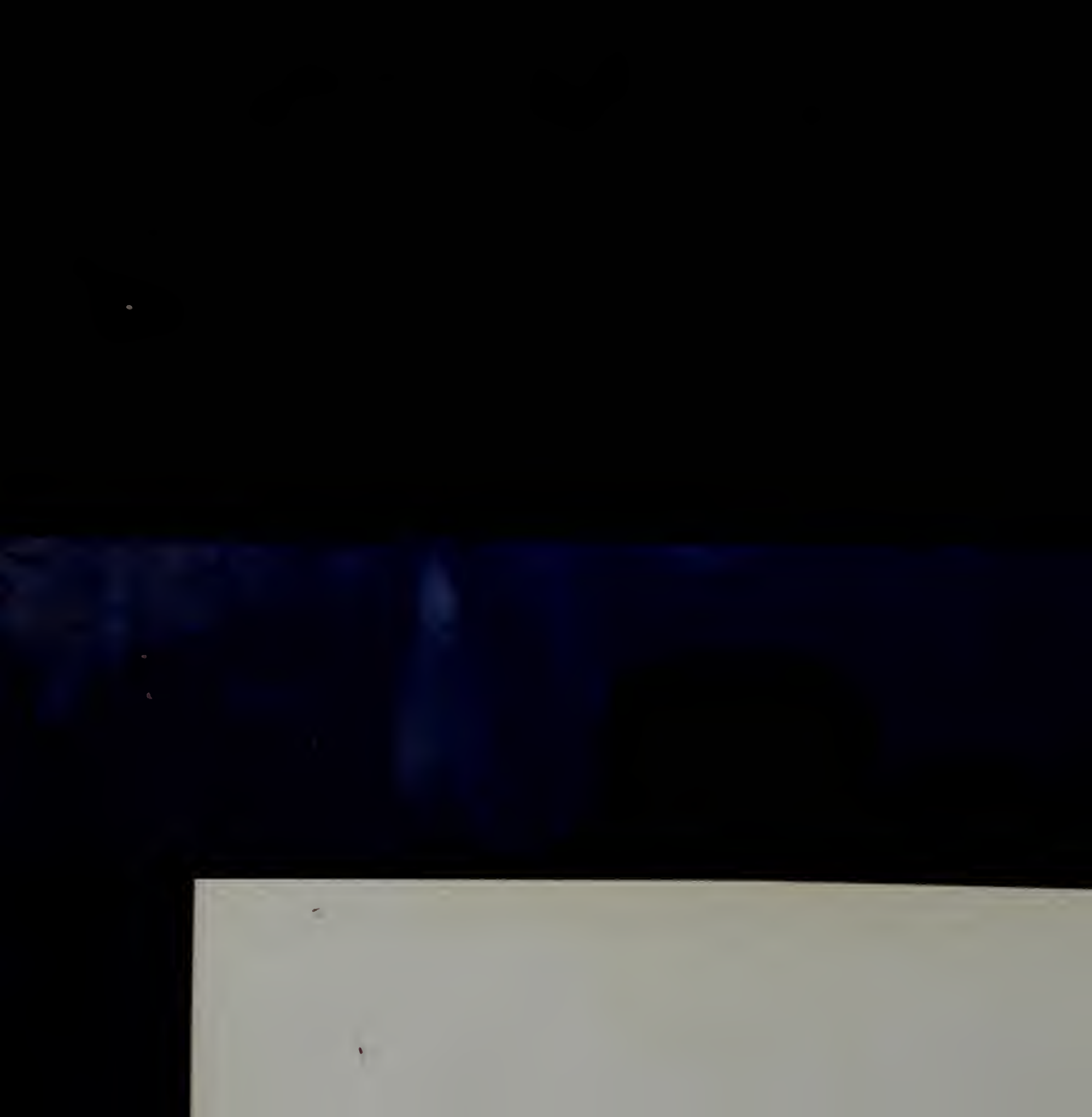
DEAR SIR,

The Guardians having referred to a Committee the Report prepared by you as to the results of your five-and-a-half years' vaccination as one of the public vaccinators for this Union, the Committee, after considering such Report, have recommended that the best thanks of the Guardians be conveyed to you for the large amount of time and effort expended by you therein, and I am instructed accordingly to express the same to you. The Report is returned to you herewith, that it may be at your disposal in any way you may think proper.

Yours faithfully,
(Signed) SAM^L. SAW,
Clerk to the Guardians.

J. P. PURVIS, Esq.,
Royal Hill,
Greenwich.







t.	Remarks.
d	{ Vaccination failed in consequence and I do not think had anything to do with the rash.
d	Child teething.
d	A re-vaccination.
g. 8 ec. 3 d	{ Vaccination failed in consequence. Caught from elder sister.
ne 16 d d d	Sister of No. 6.
d	
ed	
d	
	{ Probably unconnected with vaccination.
d	{ Totally unconnected with vaccination.
d	Child teething.
	{ Diagnosed as small pox.



TABLE IV. (Vide pages 7 and 8.)

Abstract of Table III., showing the results in years.

	Successful.	Unsuccessful.	Total.	Percentage of Failure.
February 23 to September 29, 1870	271	5	276	1·82
Year ending ditto 1871	522	16	538	2·98
Ditto ditto 1872	552	0	552	0·00
Ditto ditto 1873	538	7	545	1·29
Ditto ditto 1874	523	0	523	0·00
Ditto ditto 1875	540	2	542	0·37
	2946	30	2976	1·006

TABLE V. (Vide page 8.)

Abstract of Table III., showing the results of the last four years only.

	Successful.	Unsuccessful.	Total.	Percentage of Failure.
Year ending September 29, 1872...	552	0	552	0·00
Ditto ditto 1873...	538	7	545	1·29
Ditto ditto 1874...	523	0	523	0·00
Ditto ditto 1875...	540	2	542	0·37
	2153	9	2162	0·416



TABLE VI. (Vide page 9.)

Showing, for each quarter, the number of cases in which 8, 7, 6, 5, 4, 3, 2, and 1 vesicles were produced respectively.

CASES SUCCESSFULLY VACCINATED.													
Number of Vesicles produced.	1870.			1870-71.						1871-72.			
	February 28 to Midsummer.	Quarter ending Michaelmas.	Total.	Quarter ending Christmas.	Quarter ending Ladyday.	Quarter ending Midsummer.	Quarter ending Michaelmas.	Total.	Quarter ending Christmas.	Quarter ending Ladyday.	Quarter ending Midsummer.	Quarter ending Michaelmas.	Total.
Eight	—	—	—	—	3	—	—	3	—	—	—	—	—
Seven	1	—	1	—	1	1	—	2	1	—	—	—	1
Six	141	94	235	77	144	84	50	355	59	2	1	0	62
Five	9	4	13	1	38	25	15	79	8	125	162	172	467
Four	8	5	13	2	30	2	5	39	3	3	6	6	18
Three	2	3	5	5	22	1	4	32	0	1	0	1	2
Two	1	3	4	0	5	1	0	6	1	0	0	0	1
One.....	0	0	0	2	4	0	0	6	0	0	0	1	1
Total	162	109	271	87	247	114	74	522	72	131	169	180	552





TABLE VII. (Vide page 9.)
Abstract of Table VI., showing the totals of years.

Number of Vesicles produced.	CASES SUCCESSFULLY VACCINATED.							
	February 23rd to September 29th, 1870.	Year ending September 29th, 1871.	Year ending September 29th, 1872.	Year ending September 29th, 1873.	Year ending September 29th, 1874.	Year ending September 29th, 1875.	Total of 5½ Years.	Total of last 4 Years only.
Eight	—	3	—	—	—	—	3	—
Seven	1	2	1	1	1	—	6	3
Six	235	355	62	4	0	5	661	71
Five	13	79	467	488	493	496	2036	1944
Four	13	39	18	28	15	21	134	82
Three	5	32	2	8	7	14	68	31
Two	4	6	1	7	2	1	21	11
One	0	6	1	2	5	3	17	11
Total.....	271	522	552	538	523	540	2946	2153



TABLE VIII. (Vide pages 10 and 11.)
Showing the quality of the vesicles produced.

1873-74, Quarter ending.....	Christ- mas.	Lady- day.	Mid- summer.	Michael- mas.	Total.
A (perfect or typical)	59	87	82	62	290
B (very good)	15	6	13	9	43
C (good)	—	—	—	—	—
D (retarded)	4	5	2	1	12
E (premature)	25	15	17	17	74
F (inflamed)	5	9	10	5	29
G (very much inflamed)...	—	—	—	—	—
H (rubbed)	14	9	15	8	46
I (imperfect)	—	—	—	—	—
K (broken)	1	—	1	—	2
L (modified)	—	1	—	—	1
Not reported	1	—	—	26	27
Totals	124	132	140	137	524

1874-75, Quarter ending.....	Christ- mas.	Lady- day.	Mid- summer.	Michael- mas.	Total.
A (perfect or typical).....	90	83	108	99	380
B (very good)	3	1	6	—	10
C (good)	—	—	—	—	—
D (retarded)	6	3	4	4	17
E (premature).....	18	19	16	16	69
F (inflamed)	5	5	11	1	22
G (very much inflamed)...	—	—	—	—	—
H (rubbed)	6	5	20	8	39
I (imperfect)	—	—	—	—	—
K (broken)	—	—	—	—	—
L (modified)	—	—	—	—	—
Not reported	3	—	—	—	3
Totals	122	116	165	128	540

TABLE IX. (Vide pages 10 and 11.)

Abstract of Table VIII.

	1873-74.	1874-75.	Total.
A (typical).....	290	380	670
B (very good)	43	10	53
C (good).....	0	0	0
D (retarded)	12	17	29
E (premature)	74	69	143
F (inflamed)	29	22	51
G (very inflamed)	0	0	0
H (rubbed)	46	39	85
I (imperfect)	0	0	0
K (broken)	2	0	2
L (modified)	0	0	0
Not reported	27	3	30
Total	523	540	1063



TABLE XI. (Vide page 19.)

Re-vaccination at the Station.

			Success- ful.	Unsuc- cessful.	Total.	Percent- age of Failure.
February 23 to September 29, 1870			3	1	4	25.0
Year ending	ditto	1871	154	27	181	14.92
Ditto	ditto	1872	24	5	29	17.24
Ditto	ditto	1873	11	1	12	8.34
Ditto	ditto	1874	1	0	1	0
Ditto	ditto	1875	2	0	2	0
Total.....			195	34	229	14.85

TABLE XII. (Vide page 21.)

*Re-vaccination of recruits for the Navy received on board
H.M.S. "Fisgard," ages between 15 and 17 years.*

			Success- ful.	Unsuc- cessful.	Total.	Percent- age of Failure.
August 14 to September 29, 1872			132	21	153	13.73
Year ending	ditto	1873	1009	41	1050	3.91
Ditto	ditto	1874	955	53	1008	5.26
Ditto	ditto	1875	673	45	718	6.27
Total.....			2769	160	2929	5.47

TABLE XIII. (Vide page 22.)

*Re-vaccination of the boys admitted into the Royal Hospital School,
Greenwich, ages between 10 and 15 years.*

	Success- ful.	Unsuc- cessful.	Total.	Percent- age of Failure.
October, 1872	71	8	79	10.13
Year 1873	370	14	384	3.65
Year 1874	174	10	184	5.44
Year 1875	363	4	367	1.09
Total.....	978	36	1014	3.55

